



University of Kentucky

Central Appalachian Regional Education and Research Center

Annual Program Highlights

Reporting Period: July 1, 2013 – June 30, 2014

Principal Investigator: Wayne T. Sanderson, PhD

SECTION I

ERC SUMMARY:

The Central Appalachian Regional Education and Research Center (CARERC) provides graduate and continuing education for occupational safety and health professionals. Specifically, we (1) provide interdisciplinary occupational safety and health education for graduate students; (2) enhance the research skills of students and faculty in the targeted disciplines; (3) encourage and conduct interdisciplinary research on a variety of occupational diseases and injuries; (4) deliver continuing education, consultation and outreach to address environmental and occupational safety and health concerns; and (5) translate research into prevention practice. CARERC's scope includes counties in eastern Kentucky, western North Carolina, eastern Tennessee, western Virginia, and southern West Virginia, where elevated rates of occupational injuries and fatalities persist, particularly in production agriculture, forestry, mining, and transportation. CARERC combines the resources of the University of Kentucky College of Public Health (MPH and PhD in Occupational Epidemiology and Injury, and MPH and DrPH in Agricultural Safety and Health); the UK College of Nursing (PhD in Occupational Nursing); the UK College of Engineering (MS and PhD in Mine Safety & Health), and the Eastern Kentucky University College of Justice & Safety (MS in Occupational Safety). CARERC collaborates with other regional institutions as well as industry, labor, and government in its Pilot Research Program (PRP), Outreach, and Continuing Education (CE) programs to enhance research capacity and catalyze the translation of research to practice. We plan to support the following number of trainees each year: 11 doctoral students, 6 MPH and 7 MS students across the core programs. Building on our strengths and stature after two years of NIOSH funding, CARERC continues to serve as a catalyst for interdisciplinary research in occupational safety and health and a centralized resource center for innovative education and training.

RELEVANCE:

Building on the strengths of our education and research programs and responding to the need for innovative, coordinated occupational safety and health training in central Appalachia, the Central Appalachian Regional Education and Research Center (CARERC) provides targeted instruction, training, and applied research while serving as a recognized source of knowledge and expertise.

KEY PERSONNEL:

Sanderson, Wayne T.	University of Kentucky	ERC Director
Browning, Steven R.	University of Kentucky	Deputy Director & Continuing Education
Mannino, David	University of Kentucky	Occ Epidemiology Director
Kane, Christin	University of Kentucky	Research Coordinator
Charles, Lynda	University of Kentucky	CE Assistant Director
Dunlap, Scotty	Eastern Kentucky University	OSH Director
Reed, Deborah B.	University of Kentucky	OHN Director
Sottile, Joseph	University of Kentucky	MineSH Director
Westneat, Susan	University of Kentucky	Center Evaluation

ERC Web Link: <http://www.mc.uky.edu/erc/>

SECTION II**PROGRAM HIGHLIGHTS OF HIGH IMPACT****Mining Safety and Health****Program Director: Joseph Sotille**

Selected projects include:

Project Title: Automating Fan Ventilation and Measurement as a Means of Ensuring Proper Air Flow in Coal Mining Operations

Trainee: Kayla Mayfield

Summary of project:

Coal mines are required to be ventilated. Not only does ventilation bring fresh air to the workers but also removes contaminants such as coal and silica dust, methane, and diesel particulates which are harmful to workers. The proposed project will involve automating a fan and measurements along a ventilation network at the ventilation lab in UK's Mining and Mineral Resources Building. Then, using computer software, create an algorithm that can automatically adjust the fan for highest efficiency/performance at various ventilation network conditions. In a full scale mine, this work has the potential to allow fans to adjust to changes in the mine environment in order to ensure proper air flow to the workers.

Project Title: Lean in Mining

Trainee: Stuart Brenner

Summary of project:

My field of research is applying lean principles to the mining industry. The research will focus on safety, quality, productivity, cost, and cross training. There will be a focus on behavioral based audits and 5S audits that proactively prevent injury by encouraging the right behavior and ensuring the work area is clear of potential hazards.

Project Title: Minimizing Dust Exposure to Miners

Trainee: Greg Brenner

Summary of project:

To develop a mechanical device that would minimize the dust exposure to miners working in the face of the mine. A similar device is being used at Toyota in Georgetown, KY within the painting department.

Employment/Internships:

Kayla Mayfield completed a summer internship at the Patriot Coal Company in the safety department of the Paint Creek Complex and Kanawha Eagle. Duties included: Inspection, violation, and accident tracking and stints on the surface, underground, and at a coal preparation plant/loadout.

Greg Brenner is preparing to do an independent study analyzing accidents in underground coal mining with the aim of identifying preventive measures.

Occupational/Environmental Health Nursing

Program Director: Debra Anderson

Selected projects include:

Sharon Hunsucker

Project Title: Effects of obesity on the work and safety of farmers

Trainee: Sharon Hunsucker

Summary of project:

This project describes the relationship between obesity and work ability, work productivity, and work-related injuries in farmers. The project team will conduct anthropometric measurements and administer the work ability index (WAI) survey and work limitations questionnaire (WLQ) among farmers attending the National Farm Machinery Show, North American Livestock Expo, and other events ($n > 394$). The WAI and WLQ were developed by the Finnish Institute of Occupational Health and Tufts Medical Center, respectively, and have established reliability.

Project Title: Tobacco Use Workplace Policies in Kentucky Manufacturing Facilities

Trainee: Kacy Allen-Bryant

Summary of project:

The objectives of this secondary data analysis from the study entitled *Community Partnerships for Tobacco Use, Prevention & Control* are to: 1) examine the presence of tobacco use-related workplace policies in Kentucky manufacturing facilities and changes in these policies over time; and 2) examine the factors associated with the presence of tobacco use-related workplace policies. These factors include county-level middle and high school tobacco-free policies, population size, income, education, adult smoking rates, and pounds of tobacco produced.

Project Title: Predictors of Psychological Well-Being in African-American Registered Nurses

Trainee: Arica Brandford

Summary of project:

This research will focus on reducing health disparities in the African American community through diversification of the health care workforce. Nurses comprise the largest proportion of the health care workforce, and modifying the demographic composition of registered nurses by focusing on retention of qualified and diverse registered nurses has the potential to reduce health inequities. Nursing is a highly stressful, demanding, and taxing profession and increased job stress is linked to poor psychological health outcomes. In addition to the inherent stress of being a nurse, African-American registered nurses may experience bias and discrimination in the workplace that may create additional stressors. The goals of this study

are, using a web based survey of nurses recruited from the National Black Nurses Association, (1) evaluate the mental health of African-American registered nurses, and (2) identify predictors of psychological well-being in African-American registered nurses. Such data will bring together important themes, highlighting and synthesizing the complex relationship between stress, discrimination, its impact on psychological well-being and its effect on retention of a diverse registered nurse workforce.

Trainee publications:

Allen-Bryant, K.T. (2013, February). *Putting wellness into occupational safety and health*. Annual Worksite Wellness Conference, Lexington, KY.

Reed, D.B., Allen-Bryant, K., & Hunsucker, S. (2014). Worker demographics and implications for the OEHN. In Moore, R., & Moore, P.V. *Core Curriculum for Occupational and Environmental Health Nursing*. Pensacola, FL: AAOHN.

Warshawsky, N., Lake, S., & Brandford, A. (2013). Nurse Managers and their Practice Environments. *Nursing Administration Quarterly* (37)4: 317-325. doi: 10.1097/NAQ.0b013e3182a2f9c3.

Trainee presentations:

Brandford, A. (2013, October). Future of Nursing: Transforming Education. Podium presentation at the biannual Jonas Nurse Leader Scholarship Conference, Washington, DC

Brandford, A. (2014, April). The Current State of Kentucky's Registered Nurse Workforce: Poster Presentation at the University of Kentucky Student Scholarship Showcase

Brandford, A. (2014, May). Findings from a Recent Kentucky RN Capacity Survey. Podium Presentation at the 10th Annual Faculty Development Workshop, University of Kentucky.

Trainee grant submissions:

Brandford, A. "Predictors of Psychological Well-Being in African-American Registered Nurses" Ruth L. Kirschstein National Research Service Award (NRSA) Individual Predoctoral Fellowship (Parent F31) in review.

Faculty highlights: Dr. Deborah Reed was named a 2013 Fellow of the American Association of Occupational Health Nurses

Occupational Safety**Program Director: Scotty Dunlap**

Selected projects include:

Project Title: The effects aging workers have on workers compensation return to work programs and how that impacts companies financially.

Trainee: John Swiger

Summary of project:

Currently under development. General topic is the effects aging workers have on workers compensation return to work programs and how that impacts companies financially.

Employment/Internships:

Dalton Silcox MS-SSEM graduate (Dec 2013) hired by Marathon Oil in TX after serving the company as an environmental safety intern

John Swiger recently been hired as a Corporate Safety Director for Prestress Services Industries.

Faculty highlights:

Program director Dr. Scotty Dunlap promoted to Associate Professor at Eastern Kentucky University in recognition of his leadership in graduate education in occupational safety.

Agricultural Safety and Health**Program Director: Wayne T. Sanderson**

Selected projects include:

Project Title: Critical Violations Identified from Routine Public Swimming Pool Inspections and Their Water Quality

Trainee: Sara Kim

Summary of project:

The objective of this study was to identify critical pool-safety violations ranked by prevalence, identify trends, and offer recommendations for the Northern Kentucky Health Department's pool inspection program. 2011-2013 data pertaining to swimming pool inspections and specific to counties in the Northern Kentucky District was obtained from the Northern Kentucky Health Department's Division of Environmental Health and Safety. Data was analyzed to determine: (1) the rate of inspection failures for lifeguarded facilities, hotel and motel facilities, and apartment (APT) and homeowner association (HOA) facilities at the time of their last full regular inspection, monthly water quality inspection, and follow-up inspections due to an initial failure; (2) if there were any differences in critical violations marked among these pool groupings; (3) if these results determine different outcomes by controlling the type of pool, seasons (fall/winter, spring/summer), and years.

Project Title: Barn exposures and associated respiratory symptoms in Latino horse workers

Trainee: John Flunker

Summary of project:

Latino horse workers are a vulnerable worker population with a potential high risk of exposure to respiratory hazards found in horse barns. Although the respiratory health of Latino workers in other sectors of agriculture has been studied, to our knowledge no studies have investigated the respiratory health of Latino horse workers. We performed a cross-sectional study that examined exposure to barn related respiratory hazards and the respiratory health of 80 Latino participants currently working in the horse breeding industry. Spirometry tests of lung function and participant self-reported measures of exposure and respiratory symptoms were conducted by trained Spanish speaking promotoras. In addition to publication submissions, research findings will be shared with industry and community advisory councils, and organized into a series of issue briefs to be distributed to farm representatives.

Occupational Epidemiology

Program Directors: David Mannino/Steven Browning

David Mannino, MD, and Steven Browning, PhD, from the College of Public Health at the University of Kentucky, received funding for the Occupational Epidemiology program, for the upcoming year.

Recruitment report: 3 doctoral (DrPH) and one master's (MPH) student have been recruited into the core. All come with excellent academic backgrounds (GPAs all over 3.5); prestigious academic awards (Environmental Health Departmental Award) and impressive extern/internship/work experience (work with state health department in the area of hospital acquired infections).

Continuing Education

Program Director: Steve Browning/Lynda Charles

Ms. Lynda Charles accepted the position coordinator of CE program activities. A planning committee, composed of the core directors and key staff, has been formed for developing the annual training plan. Over the course of the year, CARERC conducted a regional needs assessment and a stakeholder survey, which have included responses from more than 300 stakeholders across all the states in the region. These data and feedback from meetings with our stakeholders, direct our focus on safety and health concerns in mining, agriculture, forestry, transportation, and the health care industry, all industries with elevated rates of occupational illnesses, injuries, and fatalities in our region.

CARERC offered "An Interdisciplinary Update on Miner Safety and Health" Conference held concurrently with the 74th Annual Meeting of the Kentucky Mining Institute. Our conference, designed for the benefit of coal miners, coal mine operators, and the health and safety personnel who support them, focused on scientific and policy developments of 1) the current science documenting the risk for respiratory diseases among coal miners; 2) state of the art tools and techniques for measuring coal dust; 3) the current status for exposure limits; and 4)

the need for periodic health surveillance of coal workers. This conference drew over 150 participants and included talks from Joseph Main, Assistant Secretary for Mine Safety and Health Administration; Bruce Watzman, MS: Senior Vice President, Regulatory Affairs, National Mining Association; Andy Barr, JD: US Representative, Kentucky Sixth Congressional District; Jay Colinet, MS, PE: Senior Scientist, Dust Ventilation & Toxic Substances, Branch National Institute for Occupational Safety and Health (NIOSH)/Office of Mine Safety & Health Research (OMSHR); Jon Volkwein, MS: retired senior research scientist, NIOSH; Edward Petsonk, AB, MDCM, FACP, FCCP: Professor, Medicine Section of Pulmonary and Critical Care Medicine West Virginia University Morgantown, WV and David Mannino, MD, FCCP: Professor and Chair, Preventive Medicine and Environmental Health University of Kentucky College of Public Health.

CARERC has partnered with the OSHA Training Institute at Eastern Kentucky University in the marketing and advertising of our course offerings and have subcontracted with OSHA TI to provide additional courses to the campus at the University of Kentucky to facilitate access to safety and health classes for our students and partners.

Dr. Reed developed and taught 3 new CE offerings, and also conducted a 90 minute session at the annual conference of the American Association of Occupational Health Nurses (AAOHN) in May 2014. Dr. Reed's was the first in the AAOHN history to highlight the agricultural industry.

In March 2014, colleagues from the Kentucky Department of Public Health (KDPH) provided Kentucky Public Health Assistance and Support Team (K-PHAST) training to CARERC students. K-PHAST is a team of volunteers trained to respond to Public Health emergencies and assist with special projects at the state and local levels.

Pilot Research Training Program

Program Director: Wayne T. Sanderson

Report on 2013-2014 pilot awards:

Project Title: Avian-livestock links in the demography of zoonotic bacteria and their implications for farm-worker health

PI: David Westneat, University of Kentucky, Morgan School of Biological Sciences

Summary of Project:

In addition to Dr. Westneat, 4 other researchers were involved including Dr. Michael Flythe of the USDA, 2 PhD students and a visiting undergraduate intern from the AgroSup University in France. The goal was to sample livestock and house sparrows living nearby screening for three types of bacteria commonly pathogenic in humans (Salmonella, E. coli, and Corynebacteria). We collected 50 samples over 10 weeks in the spring from each of goats, horses, and cows, and a total of 158 samples from house sparrows. Selection of the key results to date:

1. Positives for all three types of bacteria were found in all four species.
2. E.coli was abundant (~80% of samples positive) and similar in all 4 species
3. Salmonella was especially abundant in horses (60%) but in the rest it was around 20% positive. We are still working to confirm the typing of these, however.

4. *Corynebacteria* were most common in Cattle (40%).
5. Preliminary analyses indicate a correlation between livestock and birds at the same locations.

Lab analyses yet to do: 1) Better tests of the salmonella positives to confirm their identity, and 2) a test of all positives for antibiotic resistance. We also have a wide array of statistical analyses of the patterns of prevalence within and among each species.

The preliminary analyses of the data will be presented publicly at the program-ending Presentation Day of the NSF-REU "Suburban Ecology and Invasive Species" in August 2014.

Project Title: Appalachian Firefighters Exposure to and Perception of Risk

PI: Joan Mazur/Bill Goetz, University of Kentucky, College of Education

Summary of Project:

Numerous articles have identified the known and recognizable health and safety issues that paid professional firefighters encounter when responding to a fire, however, there has not been a robust survey focused solely on volunteer firefighters and what they perceive and recognize as risks and hazards to their own safety and health. There is also scant reporting of "near miss" incidents where the firefighter narrowly escapes injury during a fire. In Kentucky all 54 counties served by the Central Appalachian Educational Research Center region have primarily volunteer fire services with only 10 departments listed as paid professional services. There are 8,845 volunteer firefighters in total working in 324 fire services in these counties. The *Kentucky Firefighter Information & Experience Inventory* was sent to the chiefs of all of those 324 fire services for distribution to all volunteer firefighters in February through May 2014. Over fourteen hundred volunteer firefighters (1,413) responded to the 35-item survey, modified from one used in a recently completed dissertation by researcher Goetz (2013).

Project Title: Proposal to Conduct Exposure Assessments and Evaluate and Implement an Oncology Nurse Communication and Training Program at the University of Tennessee Medical Cancer Center

PI: Martin Barrie, PhD, Oak Ridge Associated Universities

Summary of Project:

Two sampling methodologies were used at UTMC to assess antineoplastic surface and air contamination: (1) Surface wipe samples, and (2) Representative personnel breathing zone air samples. Statistically determined and sufficiently large numbers of participants and samples were taken for both sampling methodologies to obtain statistically significant results. All samples will be analyzed by a laboratory with appropriate certifications and best practices.

Project Title: Developing a web-based application to generate automated access routes from timber harvesting sites to emergency personnel locations

PI: Jeff Stringer, College of Forestry, University of Kentucky

Summary of Project:

In the process of developing a web-based application (that has the ability to be used with a mobile interface and/or developed into an App for smartphone usage) to automatically generate least travel time routes from user-defined logging sites to the closest EPLs. This application will rely on the extensive base maps available in Google maps (road locations, lengths, speed limits, and traffic level), be implemented as a website using the Google application programming interface (API), and made available for public use. In addition to generating optimized access routes from logging sites to EPLs, our web-based application will store all requested access routes and expected harvesting duration to maintain online spatial dataset displaying active logging sites and associated access routes to EPLs at any given time. This offers the potential to reduce crucial estimated travel time for emergency personnel in case of injuries, facilitate compliance with OSHA regulations, and maintain an online database accessible by emergency personnel.

Project Title: Development of a Culturally Effective Educational Program in the Prevention of Heat Stress Among Spanish Speaking Hispanic Farm Workers in Rural East Tennessee

PI: Sharon Loury, East Tennessee State University

Summary of Project:

This inter-professional pilot study uses a community-based participatory research (CNPR) approach to develop and evaluate a culturally effective method to educate Spanish speaking Hispanic farm workers about the prevention of heat stress, an occupational health concern identified through an assessment of Hispanic farm workers recently conducted in Tennessee.